



Application Note: AS5x6y-ECU – Configuration

AS5x6y

Configuration on the ECU



Table of Contents

| | | |
|-------|--|----|
| 1 | General Description | 3 |
| 2 | AS5161 / AS5162 Application Settings..... | 3 |
| 2.1 | AS5161 | 3 |
| 2.1.1 | AS5161 Recommend Application Setting..... | 3 |
| 2.2 | AS5162 | 4 |
| 2.2.1 | AS5162 Recommend Application Settings | 4 |
| 3 | AS5261 / AS5262 Application Settings..... | 6 |
| 3.1 | AS5261 | 6 |
| 3.1.1 | AS5261 Recommend Application Setting for 6 Wire Configuration..... | 6 |
| 3.1.2 | AS5261Recommend Application Settings for 4-Wire Configuration..... | 7 |
| 3.2 | AS5262 | 8 |
| 3.2.1 | AS5262 Recommend Application Settings for 6-Wire Configuration..... | 8 |
| 3.2.2 | AS5262 Recommend Application Settings for 4-Wire Configuration..... | 10 |
| 3.2.3 | AS5262 Special case application settings in 4-Wire Configuration | 12 |
| 4 | Copyright..... | 14 |
| 5 | Disclaimer | 14 |
| 6 | Contact Information..... | 14 |

Revision History

| Revision | Date | Owner | Description |
|----------|------------|-------|-------------|
| 1.0 | 27.08.2013 | REI | Init Doc |

1 General Description

This Application Note is explaining the different hardware settings for the AS5x6x series. Due the different setting on the output, it's important to know how the Electric Control Unit has to be used in the Application.

In case of a wrong setting of the AS5x6y series, there is the possibility that the device is not working in the specified way.

It's important to understand, the max. Load and the pull-up resistor is not located on the sensor pcb. This load and pull-up/pull-down, is the input configuration of the ECU.

During a functionality test of the Sensor PCB its mandatory to connect the required and specified ECU load on the output. Otherwise the sensor output will stay in the specified failure band.

2 AS5161 / AS5162 Application Settings

2.1 AS5161

After programming of the AS5161, the output stage is configured in an open drain output, with a PWM signal on the output.

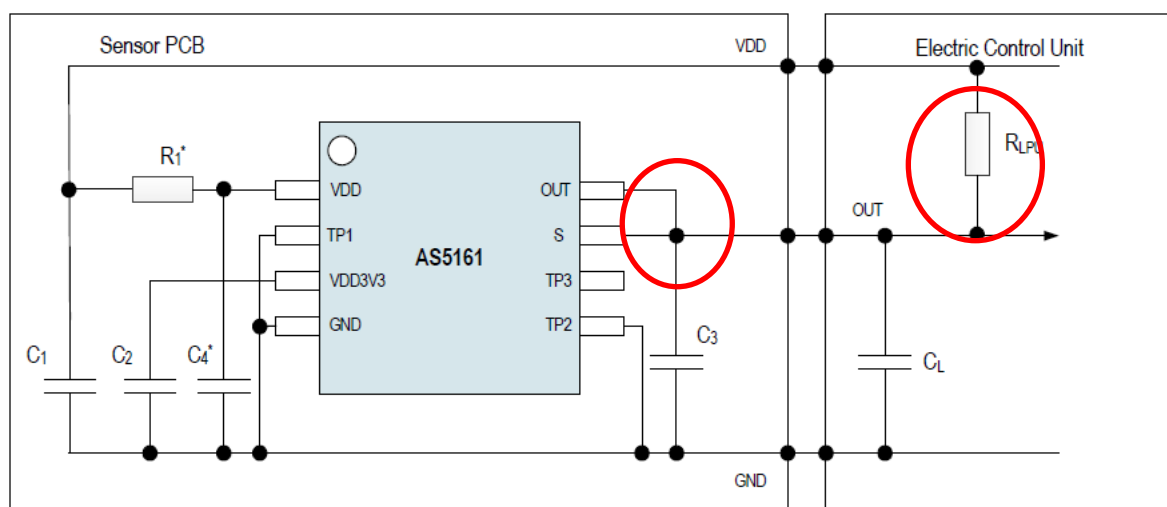
A pull up configuration on the output is mandatory to get an output signal.

IMPORTANT: Only a pull-up configuration is possible.

2.1.1 AS5161 Recommend Application Setting

$C_{Load} \leq 33nF$, $R_{LPU} = 1k\Omega - 10k\Omega$

Important: The Out - PIN and the S-Pin has to be connected due the correct working of the diagnostic features.



2.2 AS5162

After programming of the AS5162, the output stage is configured as a push-pull output, with an analog signal on the output.

A pull up or pull down configuration on the output is mandatory to get an output signal.

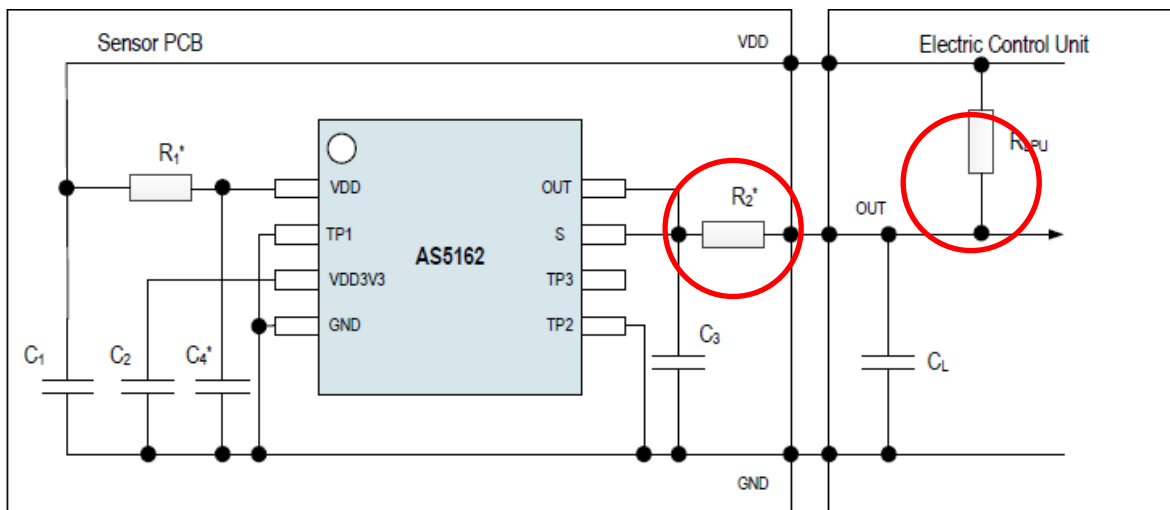
IMPORTANT: Due the push pull output (it's possible to sink and source currents), pull-up and pull-down configuration is possible

2.2.1 AS5162 Recommend Application Settings

a) Pull-up Configuration

$C_L \leq 33\text{nF}$, $R_{LPU} = 4\text{k}\Omega - 10\text{k}\Omega$

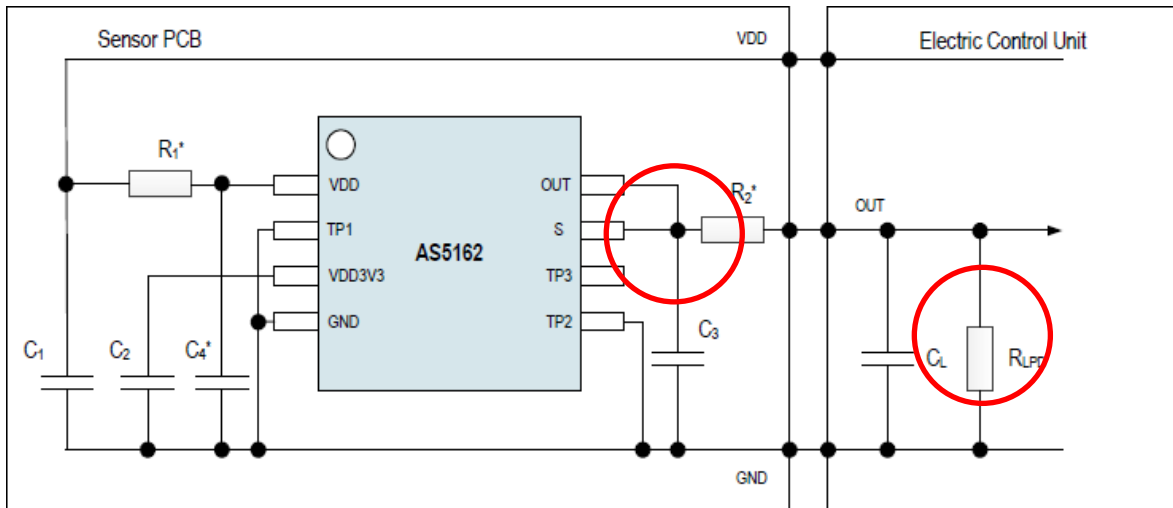
Important: The Out - PIN and the S-Pin has to be connected due the correct working of the diagnostic features.



b) Pull-down Configuration

$C_L \leq 33\text{nF}$, $R_{LPD} = 4\text{k}\Omega - 10\text{k}\Omega$

Important: The Out - PIN and the S-Pin has to be connected due the correct working of the diagnostic features.



3 AS5261 / AS5262 Application Settings

AS5261 and AS5262 are the dual die versions of the AS5161 and AS5162. The dual die version is necessary in applications with special safety reasons, where a full redundancy is mandatory.

In a full redundant application, the VDD, Output and GND is independent between both sensors. The sensor application has 6 wires which are going to the ECU.

Additional there is the possibility to use the dual die sensor in a 4 wire application. This means, VDD and GND of both sensors are connected together and only the output is independent. This kind of application is not fully redundant, but has 2 redundant outputs.

For AS5262 it's possible to use a pull up and pull down configuration at the same time. For this kind of configuration it's mandatory to use the S_T and S_B in a special configuration due the broken GND detection.

3.1 AS5261

After programming of the AS5261, both output stages are configured as open drain outputs, with a PWM signal.

A pull up configuration on both outputs are mandatory to get an output signal.

IMPORTANT: Only a pull-up configuration is possible.

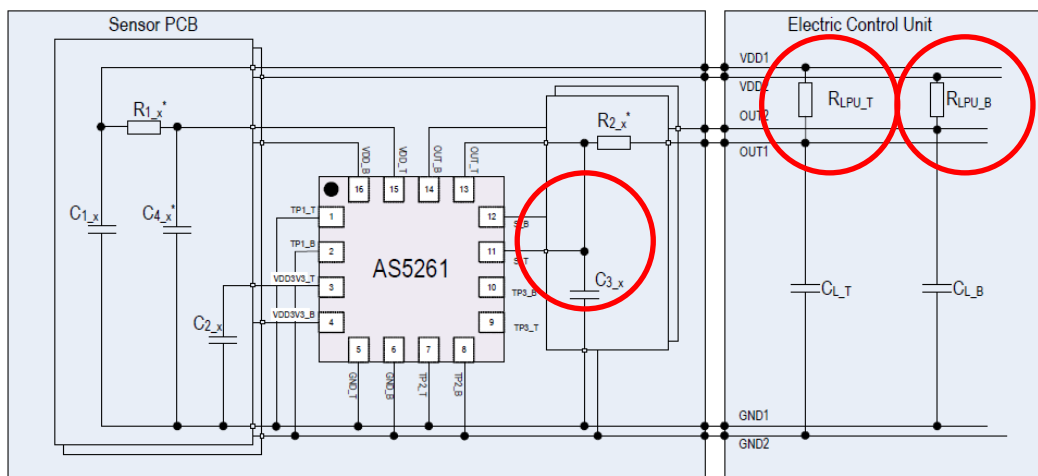
3.1.1 AS5261 Recommend Application Setting for 6 Wire Configuration

$CL \leq 33nF$, $RLPU = 1k\Omega - 10k\Omega$.

Important: The pull up connection is necessary on both outputs. The Out - PIN and the S-Pin has to be connected correctly due a right working of the diagnostic features.

OUT_T has to connect with S_T.

OUT_B has to connect with S_B



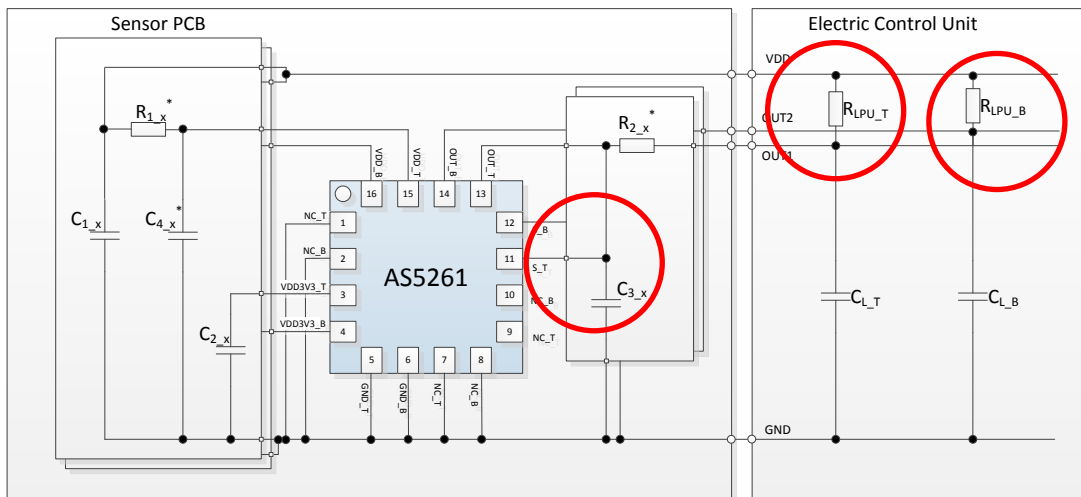
3.1.2 AS5261 Recommend Application Settings for 4-Wire Configuration

$C_L \leq 33nF$, $R_{LPU} = 1k\Omega - 10k\Omega$

Important: In the 4-wire mode, VDD and GND of both sensors are connected together. The pull up connection is necessary on both outputs. The Out - PIN and the S-Pin has to be connected correctly due the right working of the diagnostic features.

OUT_T has to connect with S_T.

OUT_B has to connect with S_B



3.2 AS5262

After programming of the AS5262, both output stages are configured as push-pull output, with an analog signal on the output.

A pull up or pull down configuration on both outputs are mandatory to get an output signal.

IMPORTANT: Due the push pull output (it's possible to sink and source currents); pull-up and pull-down configuration is possible

3.2.1 AS5262 Recommend Application Settings for 6-Wire Configuration

a) Pull-up Configuration

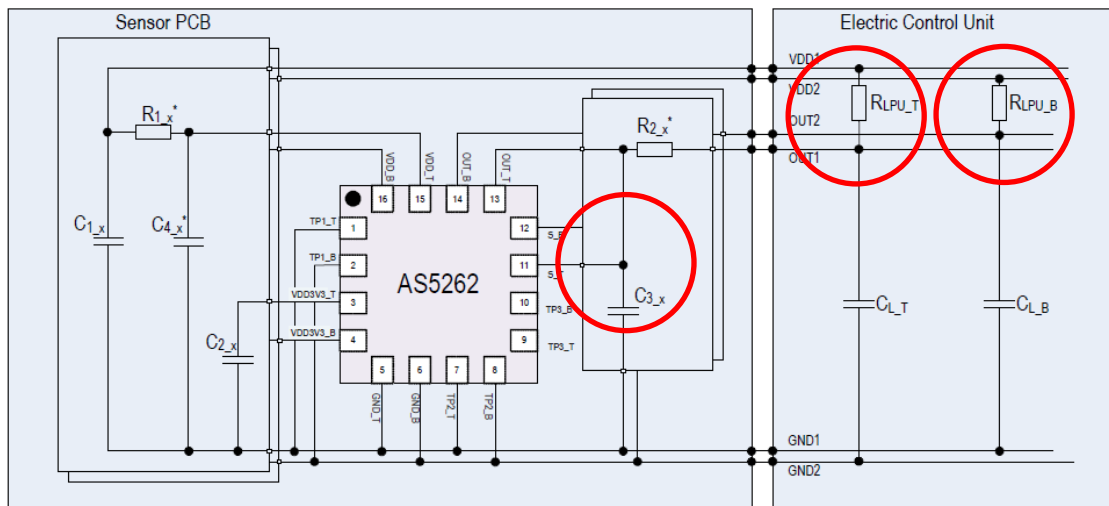
$CL \leq 33nF$, $RLPU = 4k\Omega - 10k\Omega$

Important: The pull up connection is necessary on both outputs .

The Out - PIN and the S-Pin has to be connected correctly due the right working of the diagnostic features.

OUT_T has to connect with S_T.

OUT_B has to connect with S_B



b) Pull-down Configuration

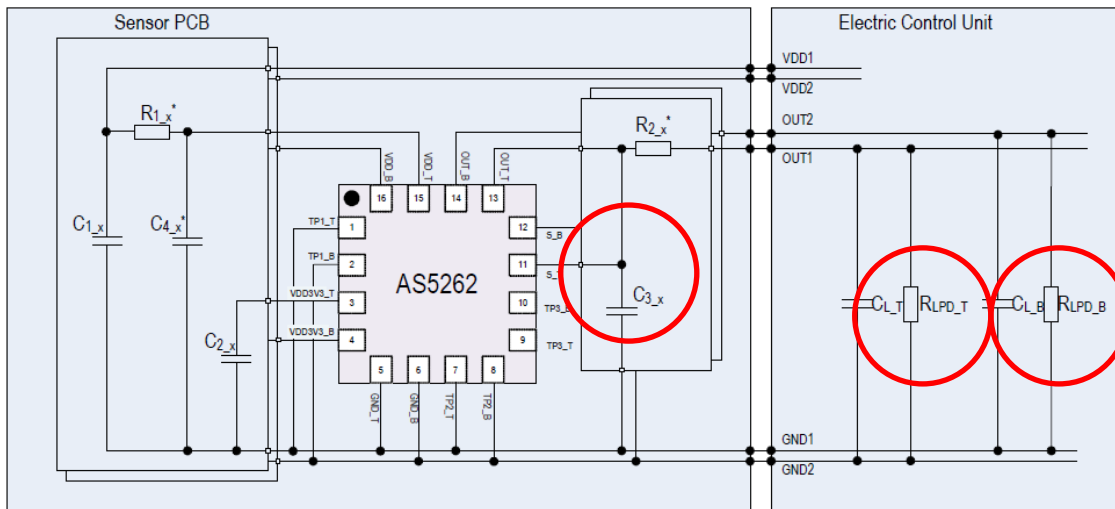
$CL \leq 33nF$, $RLPD = 4k\Omega - 10k\Omega$

Important: The pull up connection is necessary on both outputs.

The Out - PIN and the S-Pin has to be connected correctly due the right working of the diagnostic features.

OUT_T has to connect with S_T.

OUT_B has to connect with S_B



3.2.2 AS5262 Recommend Application Settings for 4-Wire Configuration

a) **Pull-up Configuration**

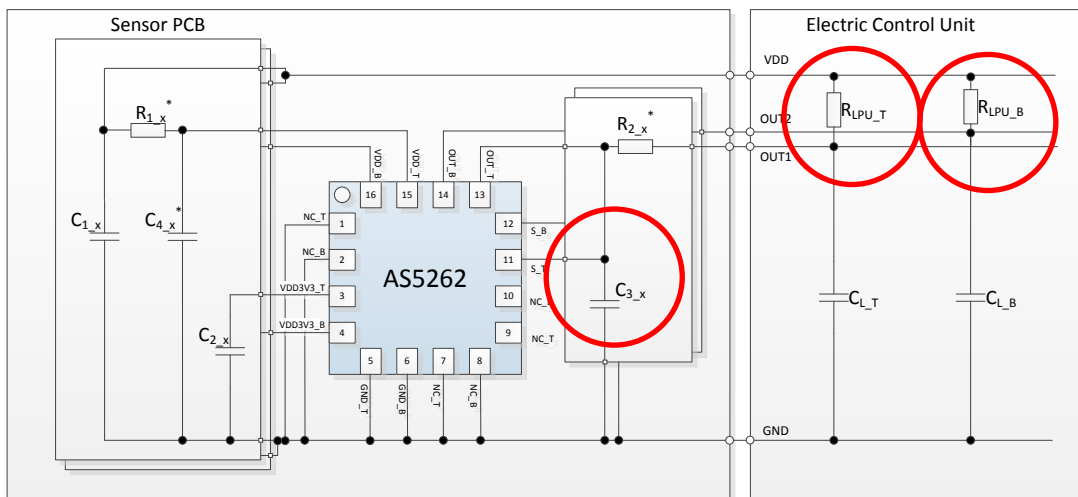
$CL \leq 33nF$, $RLPU = 4k\Omega - 10k\Omega$

Important: The pull up connection is necessary on both outputs.

The Out - PIN and the S-Pin has to be connected correctly due the right working of the diagnostic features.

OUT_T has to connect with S_T.

OUT_B has to connect with S_B



b) Pull-down Configuration

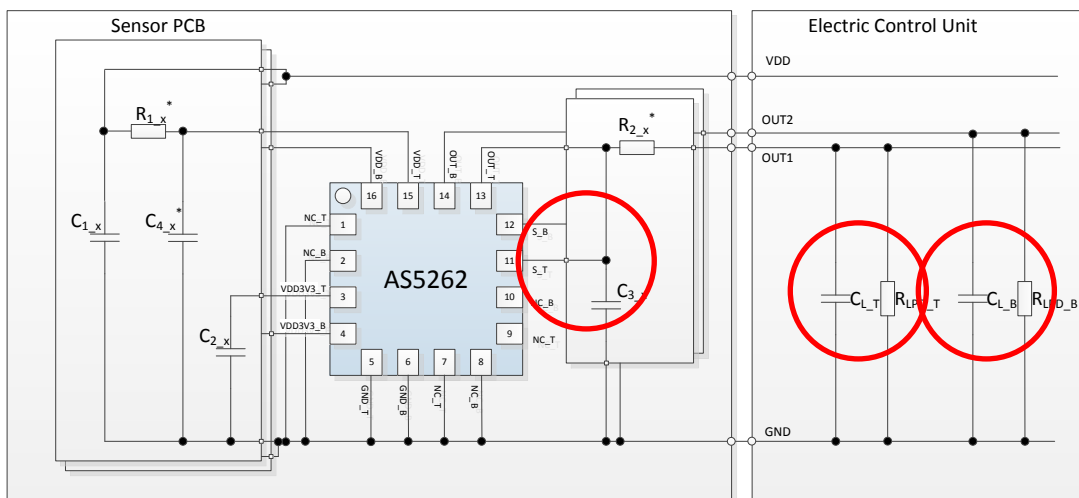
$CL \leq 33nF$, $RLPD = 4k\Omega - 10k\Omega$

Important: The pull up connection is necessary on both outputs.

The Out - PIN and the S-Pin has to be connected correctly due the right working of the diagnostic features.

OUT_T has to connect with S_T.

OUT_B has to connect with S_B



3.2.3 AS5262 Special case application settings in 4-Wire Configuration

In the special case application settings it's possible to set at one output a pull-up and on the second output a pull-down configuration of the ECU.

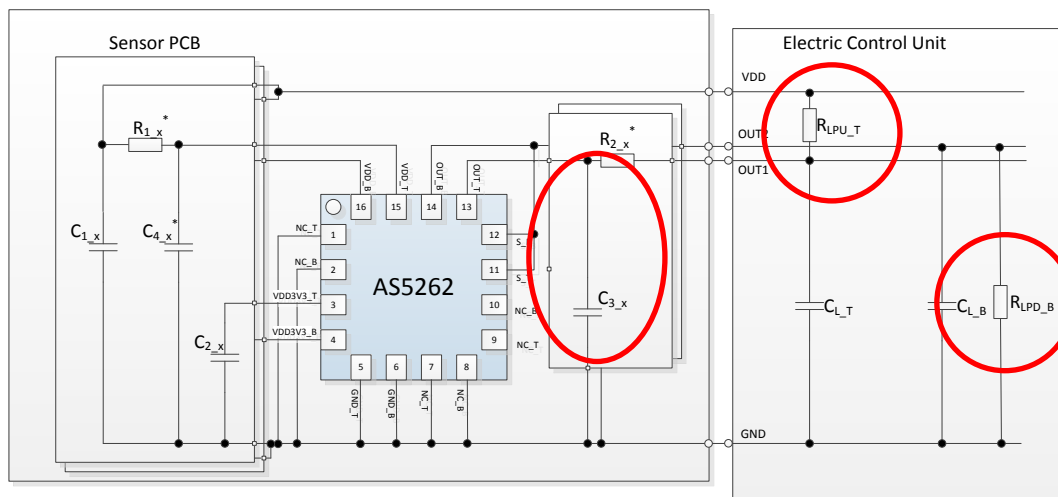
Important: It's not allowed to use the same resistor value for both outputs. The pull-down resistor has max recommended value half of 10kOhm. In case of a broken GND issue, all the residual leakage current of both DIEs flows through the pull down resistor.

a) Pull-down Configuration on Out B (Bottom DIE Die)

OUT_T : $CL \leq 33nF$, $RLPU_T = 4k\Omega - 10k\Omega$

OUT_B ; $CL \leq 33nF$, $RLPD_B = 4k\Omega - 5k\Omega$

Important: The Out_B - PIN and both sense pins (S_T and S_B) has to be connected due the correct working of the broken GND diagnostic features.

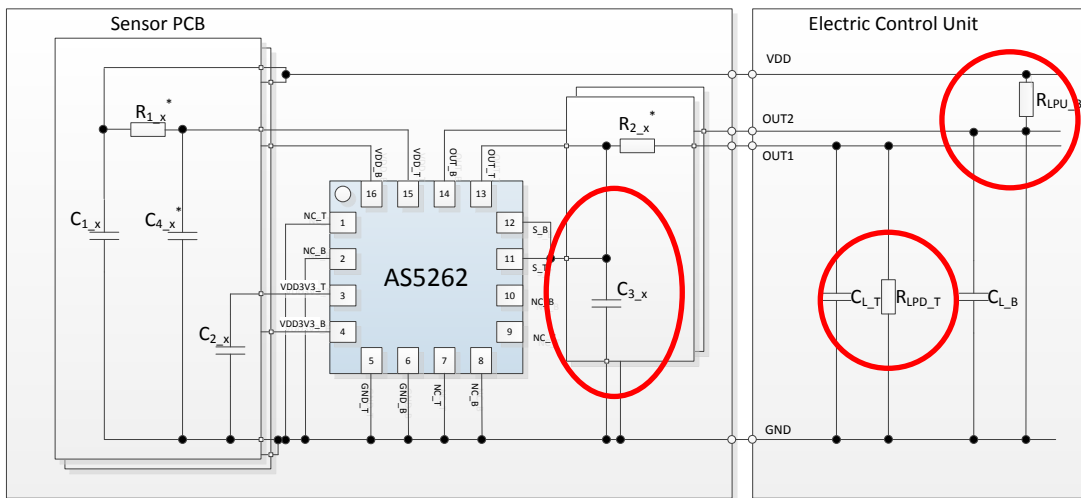


a) Pull-down Configuration on Out T (Top Die)

OUT_B : $CL \leq 33nF$, $RLPU_B = 4k\Omega - 10k\Omega$

OUT_T ; $CL \leq 33nF$, $RLPD_T = 4k\Omega - 5k\Omega$

Important: The Out_T - PIN and both sense pins (S_T and S_B) has to be connected due the correct working of the broken GND diagnostic features.



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